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(तीसरा पुनरीक्षण)

Indian Standard

TRANSMISSION BELTING — FRICTION SURFACE RUBBER BELTING — SPECIFICATION

(Third Revision)

UDC 621·852 : 678·4

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

August 1993 Price Group 7

Pulleys and Belts Sectional Committee, LM 09

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Pulleys and Belts Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

This standard was originally published in 1959 and subsequently revised in 1965 and 1976. In the present revision, the following principal changes have been made:

a) Method for determination of length of an endless belt has been included.

b) Nominal belt thickness values incorporated. Separate values for different type of ducks and number of plies have been specified. Tolerances on belt thickness have also been included.

c) Norms for transverse joints in fabric plies have been elaborated.

d) Full thickness breaking strength and elongation have been specified instead of individual ply breaking strength and elongation.

e) Requirement for adhesion strength has been improved.

f) Parameters and calculations for belt design have been included for the guidance of the users and the designers.

g) Power rating tables have been included giving details of recommended power transmission for each type of belt and based on the diameter of the smaller pulley.

h) An example is given in Annex E of a belt design calculation.

Warning : Belting made to this Indian Standard will not necessarily be electrically insulating at any stage of its life, and should not, therefore, be used as an insulator for any electrical work.

The minimum pulley diameters, for given belt speeds and belt plies representative of present day engineering practice are given in Table 21 of Annex E for information of user.

Transmission belts can also be made of PVC (plastic) with textile construction (solid woven). In view of the non-availability of data on performance requirements, plastic belts have not been covered in the specification. As and when data on performance requirement are available the same will either be included in the standard through an amendment or separate standard may be prepared.

While preparing this standard assistance has been derived from the following publications:

ISO 22-1991 'Belt drives — Flat transmission belts and corresponding pulleys — Dimensions and tolerances', issued by International Organization for Standardization (ISO).

BS 351 : 1976 'Specification for rubber, balata or plastics flat transmission belting of textile construction for general use' issued by British Standards Institution (BSI).

Indian Standard

TRANSMISSION BELTING — FRICTION SURFACE RUBBER BELTING — SPECIFICATION

(Third Revision)

1 SCOPE

This standard lays down the requirements for friction surface rubber transmission belting that is, fabric belting possessing no distinct rubber cover other than that imparted to the fabric by impregnation with rubber compound.

2 REFERENCES

IS 5996:1984 'Cotton belting ducks (*second revision*)' is a necessary adjunct to this standard.

3 DIMENSIONS AND TOLERANCES

3.1 Length

The length of the belting shall be as specified by the purchaser subject to the following tolerances:

a) For belts delivered in the endless state and mounted in that way ± 0.5 Percent

b) For open belts + 2.0 Percent
- 0.5 Percent

3.1.1 The length of the endless belt shall be measured in accordance with the method described in Annex A.

3.2 Width

Nominal Belt Width *mm*	*Tolerance on Nominal Belt Width* *mm*
25	± 2
32	
40	
50	
63	
75	± 3
80	
90	
100	
112	
125	
140	±4
150	
160	
180	
200	
224	
250	
280	±5
315	
355	
400	
450	
500	
630	

3.3 Thickness

Ply Construction	*Nominal Belt Thickness (mm)*				*Tolerance on Nominal Belt Thickness* mm
	Soft Duck		Hard Duck		
	28 Type	32 Type	31 Type	34 Type	
3 Ply	3.8	4.4	3.8	3.9	+ 0.6 - 0.3
4 Ply	5.1	5.8	5.1	5.3	+ 0.7 - 0.4
5 Ply	6.4	7.2	6.4	6.7	+ 0.8 - 0.4
6 Ply	7.7	8.6	7.7	8.1	+ 0.9 - 0.5
7 Ply	9.1	10.1	9.1	9.5	+ 1.0 - 0.5
8 Ply	10.4	11.5	10.4	10.9	+ 1.1 - 0.6
9 Ply	11.7	12.9	11.7	11.3	+ 1.2 - 0.6
10 Ply	13.0	14.3	13.0	13.7	+ 1.3 - 0.7

4 MATERIAL

4.1 The cotton belting ducks employed for the manufacture of belting shall conform to 'Soft' duck of type 28 and 32 and 'Hard' duck of type 31 and 34 of IS 5996 : 1984.

4.2 The nominal masses of the above ducks are given below:

Type of Duck		*Nominal Mass* g/m²
Soft	28	845
	32	950
Hard	31	910
	34	970

5 CONSTRUCTION

5.1 The belting shall consist of plies of woven cotton canvas frictioned and skimcoated with rubber compound and vulcanized together in a uniform manner. The belting may be folded or cut edge construction, as may be required by the purchaser.

5.2 The folded edge belting is constructed with a separate outside jacket ply and the seam in this ply shall be completely filled with rubber cord or seam strip and shall comply with the requirements of **8.4**.

5.3 The transverse joints in fabric plies shall be at an angle of 45° to 70° with the longitudinal axis. The minimum distance between the joints shall be as follows:

a) Outer plies : No joints

b) Inner plies : Not less than 30 m apart

c) Adjacent plies : Not less than 3 m apart. There shall not be more than two joints in any one ply in each 100 m belting

d) Non-adjacent plies : Not less than 3 m apart

5.4 The belting shall be straight when laid flat, shall be of reasonably uniform thickness across the width, and the workmanship and finish shall be in accordance with the best manufacturing practice.

6 DESIGNATION

The belting shall be designated by the number of this standard the width, ply, and type of duck.

Example :

A belt of 125 mm width and 6 plies made from fabric Type 28 shall be designated as:

Transmission Belt IS 1370 125 × 6 × 28

7 SAMPLING

Depending upon the length of the transmission belt of the same characteristics (width, ply, type of duck) ordered, the samples shall be drawn in accordance with Table 1.

Table 1 Sampling Plan for Transmission Belts

Length Offered m	**Number of Samples**1)
Up to 7 500	2
7 501 to 17 500	3
17 501 to 27 500	4

1) A sample shall be of the full width of the finished belting and not less than 600 mm in length.

8 TESTS

8.1 Full Thickness Breaking Strength

8.1.1 The full thickness breaking strength of the finished belting, when determined in accordance with the method described in Annex B shall be not less than the values given in Table 2.

Table 2 Full Thickness Breaking Strength

Ply Construction	**Longitudinal Direction kN/m Width (*Min*)**				**Transverse Direction kN/m Width (*Min*)**			
	Soft Duck		Hard Duck		Soft Duck		Hard Duck	
	28 Type	32 Type	31 Type	34 Type	28 Type	32 Type	31 Type	34 Type
3 Ply	165	190	165	190	65	75	95	110
4 Ply	210	240	210	240	85	95	120	145
5 Ply	255	290	255	290	105	115	145	175
6 Ply	295	340	295	340	120	135	165	200
7 Ply	335	385	335	385	135	155	190	225
8 Ply	375	425	375	425	150	170	210	250
9 Ply	410	465	410	465	165	185	230	270
10 Ply	440	500	440	500	175	200	250	290

8.1.2 In case of narrow belts from which test pieces of sufficient length cannot be obtained, the full thickness breaking strength in transverse direction shall be determined from prepared test slabs.

8.2 Full Thickness Elongation

8.2.1 *Reference Load*

Reference load is defined as being one-third of the specified full thickness breaking strength of the belt in the longitudinal direction (*see* **8.1.1**).

8.2.2 The elongation of the finished belting in the longitudinal direction at the reference load, when tested by the method described in Annex B shall be not less than 3 percent and not more than 7 percent.

8.3 Adhesion Test

8.3.1 The mean force required to strip one ply from the next, when determined by the method described in Annex C shall be not less than 3.0 kN/m in longitudinal direction.

8.3.2 In the case of narrow belts from which test pieces of sufficient length cannot be obtained, the adhesion test shall be carried on prepared test slabs.

8.4 Test on Seam Strip

The seam strip of all belts 50 mm wide and over, when tested according to the method described in Annex D shall not show any signs of cracking or loosening in the seam.

9 TESTING FACILITIES AND REJECTION

9.1 The manufacturer shall, at his own cost, supply all labour and appliances for the tests. In the absence of facilities at his own premises for carrying out prescribed tests, the tests shall be carried out by an approved authority as agreed between manufacturer and purchaser.

9.2 Re-tests and Rejection

Should any sample fail to comply with the specified test requirements, two additional samples shall be drawn and tested according to specified procedure. In the event of either of these two samples failing to comply with the test requirements, the supply shall be rejected. If both the samples pass the test, the supply shall be accepted.

10 MARKING

10.1 The belting shall be marked at intervals of maximum 8 m as follows:

a) Manufacturer's name and trade mark, if any;
b) Type of duck;
c) Last two figures of the year of manufacture; and
d) Number of this standard.

10.2 Standard Mark

Details available with the Bureau of Indian Standards.

11 PACKING

11.1 The belting may be packed in waterproof packing film and then covered with double hessian cloth or as agreed to between the purchaser and the manufacturer. Information about the width of the belting number of plies, length, number of this standard and type of duck shall also be indicated on the packing.

12 POWER APPLICATION

12.1 For information of the users, recommendations for power application of transmission belting have been given in Annex E.

13 INFORMATION FOR ENQUIRY AND ORDER

13.1 In order to obviate difficulties in procuring right type of belts, it is recommended that the purchaser should give the particulars mentioned in Annex F when placing an enquiry or order.

ANNEX A

(*Clause* 3.1.1)

DETERMINATION OF LENGTH OF AN ENDLESS BELT

A-1 PRINCIPLE

The length of an endless belt is determined by the summation of a number of consecutive measurements made along either surface of the untensioned belting while laid out flat, to the result of which is applied a correction for the thickness.

A-2 PROCEDURE

A-2.1 Measure the belt by making a number of individual consecutive length measurements, as accurately as possible, along the surface of the belt while each consecutive length of belting is laid out flat and free from tension, reference marks being made to indicate the beginning and end of each measurement.

A-2.2 Make the individual measurement in accordance with **A-2.2.1** or **A-2.2.2** as appropriate.

A-2.2.1 For belts less than 30 m in length, take measurements between one-quarter and one-third of the nominal circumferential length except for the last one which may be less than one-quarter.

A-2.2.2 For belts more than 30 m in length, take measurements not less than 7 m and not more than one-third of the nominal circumferential length except for the last one which may be less than 7 m.

A-2.3 The sum of the individual measurements is the free pitch circumferential length *Lp*.

A-3 CALCULATION

Calculate the internal circumferential length, termed net endless length by the following formula:

$$Li = Lp - \frac{\pi t}{1\,000}$$

where

Li is the net endless length (internal circumferential length) in m

Lp is the free pitch circumferential length in m

t is the thickness in mm

ANNEX B

(*Clauses* 8.1.1 *and* 8.2.2)

DETERMINATION OF FULL THICKNESS BREAKING STRENGTH AND ELONGATION

B-1 TENSILE TESTING APPARATUS

B-1.1 The accuracy of the tensile testing machine shall be within ± 1 percent.

B-1.2 The range of the machine shall be so chosen that the loads to be measured fall within 10 and 90 percent of the full scale deflection.

B-1.3 The load shall be applied smoothly and the rate of traverse of the driven grip shall be 100 ± 10 mm per minute.

B-1.4 The method of holding the test piece shall be such as to ensure proper alignment of the test pieces eliminating slip or damage during testing. The use of transverse serrated grips as illustrated in Fig. 1 are permissible. For very thick belts, double compartment grips as illustrated in Fig. 2 are permitted. The grip shall be free to move without undue friction and in correct alignment.

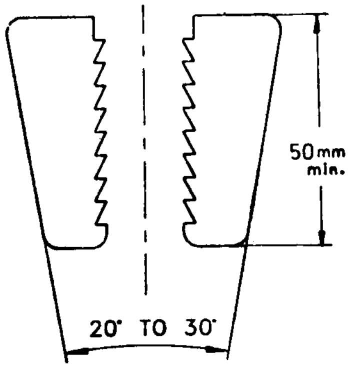


FIG. 1 SINGLE COMPARTMENT GRIPS

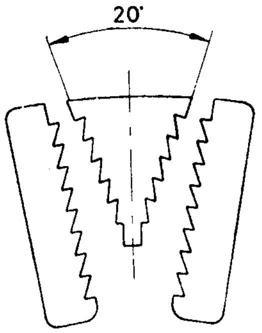


FIG. 2 DOUBLE COMPARTMENT GRIPS

B-2 TEST PIECES

Each test piece shall conform to the shape and dimensions of any of types shown in Fig. 3 and shall be cut by the use of a suitable die, the cutting angle of which shall not exceed 18° (*see* Fig. 4).

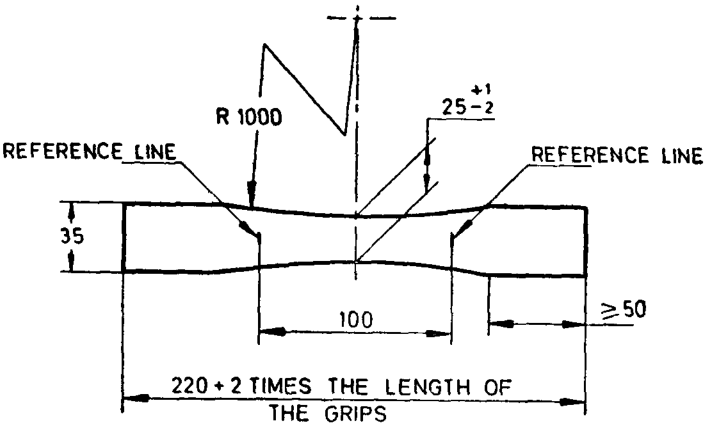
B-3 PREPARATION AND CONDITIONING OF TEST PIECES

B-3.1 Six test pieces, three in the longitudinal direction and three in the transverse direction shall be cut not less than three days from the date of manufacture of the belt and the test pieces shall be conditioned for three days at 27 ± 2°C and 65 ± 5 percent relative humidity. Conditioning may be increased to a maximum of 14 days when agreed between the manufacturer and the purchaser.

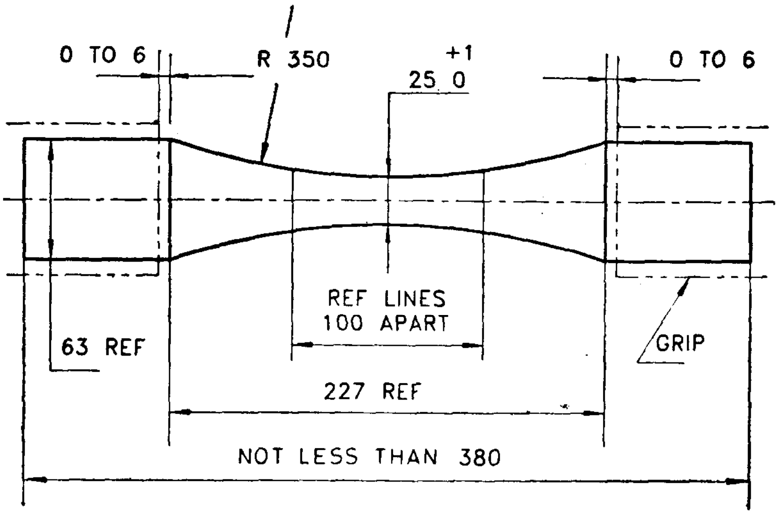
B-3.2 The thickness of the test pieces shall be that of the belting under test. Test pieces shall be cut so as to contain no joints such as may be permitted under **5.3**.

B-4 PROCEDURE

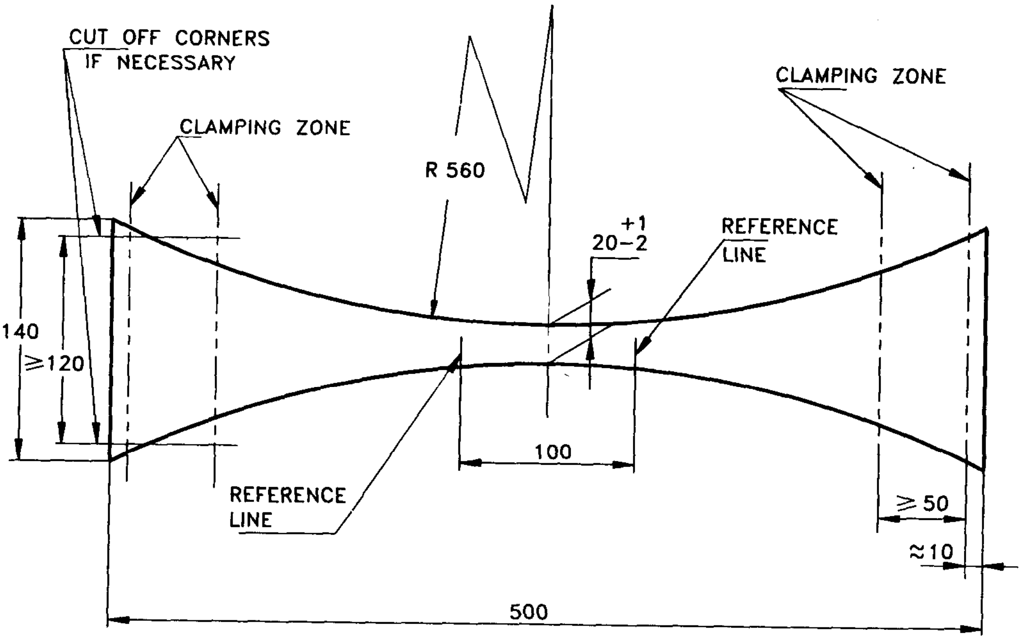
B-4.1 Measure the width of the test piece at its narrowest point. Place the test piece in the grips or jaws of the tensile testing machine so that the widest part of the test piece (*see* Fig. 3) is carefully positioned in line with the front edges of the jaws and so that the axis of the test piece coincides with the centre line of the jaws.



TYPE A



TYPE B



TYPE C

FIG. 3 TYPES OF TEST PIECES

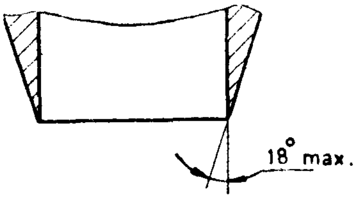


FIG. 4 CROSS-SECTION OF DIE

B-4.2 The machine shall be started and the driver jaw transversed at the specified rate until rupture of the test piece occurs, at which point the maximum load applied shall be noted.

B-4.3 The results of breaks occurring outside the reference lines on the test piece shall normally be discarded, but if the results of such test pieces are required they shall be reported as 'jaw breaks'.

B-4.4 The elongation shall be determined in the longitudinal direction by measuring the distance between the central points of the reference lines at one-third of the specified breaking strength of the belt (Reference load).

B-5 RESULTS

B-5.1 The breaking strength of each test piece shall be reported in kN/m width and the mean value for each of the two sets of three tests in the longitudinal and transverse direction shall be reported.

B-5.2 The elongation values in the longitudinal direction shall be expressed as a percentage of the initial distance between the reference lines. The mean value for the three tests made in the longitudinal direction shall also be reported.

ANNEX C

(*Clause* 8.3.1)

METHOD OF CONDUCTING ADHESION TEST OF PLIES

C-1 TEST PIECES

Cut four test pieces, each 25.0 ± 1.0 mm wide and of sufficient length to allow a minimum test length of 100 mm, from the sample in the warp direction, using a sharp tool which leaves a clean edge. The thickness of the ply which is to be separated shall not exceed 6 mm. If the ply which is to be separated exceeds 6 mm in thickness, cut it down to the requisite thickness before proceeding with the test. The thickness of this ply shall be not greater than the thickness of the remainder of the test piece.

C-2 CONDITIONING OF TEST PIECES

The test pieces shall be cut not less than 24 hours from the time of the manufacture of the belt and test pieces shall be conditioned for 24 hours at a temperature of 27 ± 2°C and 65 ± 5 percent relative humidity. Conditioning may be increased to a maximum of 7 days when agreed to between the manufacturer and the purchaser.

C-3 TEST MACHINE

The test machine need not necessarily be of the pendulum type. It will suffice if it can ensure substantially constant speed of traverse of the moving grip.

C-4 PROCEDURE

Break the bond to be tested over a distance of approximately 75 mm using sharp knife and pincers. Mount the test piece in the machine with the body of the test piece in the non-driven grip and the ply to be separated in the power-driven grip, so that the angle of separation is approximately 180°. Adjust the test piece in the grip so that the tension is distributed uniformly and no twisting occurs in the ply to be separated during the test. Start the machine and maintain the rate of travel of the power-driven grip at 50 ± 2.5 mm per minute. Take the readings of the load causing separation, at the intervals of 12.5 mm over a length of 100 mm. Alternatively, an autographic recording of the test may be taken. Repeat the procedure on separate plies from the face ply to the centre ply. Test the second test piece in the same way commencing with the back ply and proceeding again to the centre ply. Repeat the whole test with a second pair of test pieces.

C-5 RESULTS

Express the adhesion values as the average force in kN/m width required to cause separation of the plies. The results are the average for four test pieces where an autographic record is taken.

ANNEX D

(*Clause* 8.4)

METHOD OF TESTING SEAM STRIP

D-1 PROCEDURE

Take a transverse section of the sample of the belting 100 mm long for belts 100 mm wide or more. For belts 50 mm wide and above but less than 100 mm, take a transverse section of the sample equal to the actual width of the sample. Beginning on the seamless side, remove the plies until only three remain intact. Draw a line down the middle of the seam strip. Draw another line on each side of the middle line, 15 mm distant from it and parallel to it. Double the section along the centre line and insert in a vice so that the jaws grip the test piece on the two outer lines. Tighten the vice until the inner surface of the doubled sample just touch at the top of the vice and hold the test piece in that position for 10 minutes.

ANNEX E

(*Clause* 12.1)

RECOMMENDATIONS FOR POWER APPLICATION OF TRANSMISSION BELTS

E-1 POWER TRANSMITTED

E-1.1 The power which a transmission belt is capable of transmitting without being overstressed varies with the type of service, the operational hours per day and the arc of contact on the smaller pulley.

The correction factors that are taken into account of these influences are given in Tables 3 and 4 and should be applied to the ratings given in Tables 5 - 20 to find out the power which can be transmitted by a transmission belt.

E-1.1.1 The width of the belt and type of belt (No. of plies and fabric type) required for a particular drive may be determined from the following formula:

$$W \times Pr = \frac{P \times Fa \times 25}{Fc}$$

where

W = Width of the belt in mm,

Pr = Power rating of 25 mm wide belt in kW (from Tables 5 to 20),

P = Drive power in kW,

Fa = Correction factor according to service (from Table 3), and

Fc = Correction factor for arc of contact (from Table 4).

W, the width of the belt, is to be determined based on the face width of the driving and driven pulleys.

Type of belt (No. of plies and fabric type) should be selected to get the desired *Pr* given in Tables 5 to 20.

Judicious selection of type of the belt is to be done considering the diameter and revolutions per minute of the small pulley.

Reference to Table 21 will ensure that the belt will neither be too thick and stiff, nor too thin and flexible for given pulley diameters and belt speed.

E-1.1.2 The arc of contact on the smaller pulley should be based on the effective arc as determined by the following formula:

$$\text{Arc of contact angle} = \cos^{-1} \frac{D-d}{2C}$$

where

D = Pitch diameter of larger pulley in mm,

d = Pitch diameter of smaller pulley in mm, and

C = Centre distance of the drive in mm.

E-2 BELT LENGTH

E-2.1 The length of belt corresponding to given pulley diameters and centre distance may be obtained by the following formula:

$$Li = 2C + 1.57\,(D + d) + \frac{(D-d)^2}{4C}$$

where

Li = Internal circumferential length of the belt in mm (*see* Annex A),

D = Diameter of the larger pulley in mm,

d = Diameter of the smaller pulley in mm, and

C = Centre distance of the drive in mm.

E-3 Centre distances may be calculated from the following formula:

$$\text{Centre distance } C = A + \sqrt{(A^2 - B)}$$

where

$$A = \frac{Li}{4} - \frac{(D + d)}{8} \text{ in mm}$$

$$B = \frac{(D - d)^2}{8} \text{ in mm}$$

where

D = Diameter of the larger pulley in mm,

d = Diameter of the smaller pulley in mm, and

Li = Internal circumferential length of the belt in mm (*see* Annex A).

E-4 An example of the calculation for a flat transmission belt is given below:

The requirement is to design a flat belt drive to transmit power from on 11 kW 1 440 rev/min normal torque a.c. motor to a 475 rev/min rotary dryer. The machine will be direct-on-line started and run 8 h/day.

Installation details:

Driving pulley diameter = 200 mm
Width 150 mm, standard crown = 600 mm
driven pulley diameter
Width 150 mm, standard crown = 2 500 mm
centre distance (C)
Proposed belt width (W) = 125 mm
Drive power (P) = 11 kW

$$\text{Arc of contact} = 2\cos^{-1}\frac{600 - 200}{2 \times 2\,500} = 170^{\circ}$$

Selection

a) Service factor (Fa) from Table 3 = 1.2

b) Arc of contact factor (Fc) from Table 4 = 0.96

Using the formula given in **E-1.1.1**, power rating of per 25 mm Pr width is

$$Pr = \frac{11 \times 1.2 \times 25}{125 \times 0.96} = 2.75\ \text{kW}$$

Table 7 shows that a type 4 ply × 28 or 4 ply × 31 will transmit 2.80 kW per 25 mm width on a 200 mm pulley running at 1 440 rev/min. Because this is an excess of the requirements of 2.75 kW, this belt is selected.

Table 3 Correction Factor (Fa) According to Service
(*Clauses* E-1.1 *and* E-1.1.1)

Types of Driven Units		**Types of Driving Unit**							
		A.C. motors, normal torque squirrel cage, synchronous and split phase. D.C. motors: shunt wound. Internal combustion engines over 600 rev/min				A.C. motors, high torque, highslip, replusion-induction, single phase, series wound and compound wound. Single-cylinder engines and internal combustion engines under 600 rev/min, line shafts, clutches, brakes, direct on line starting			
		Operational hours per day				**Operational hours per day**			
		10 and under		Over 10		10 and under		Over 10	
		Reduced Voltage start 85% of line voltage	Direct on line start	Reduce voltage start 85% of line voltage	Direct on line start	Reduced voltage start 85% of line voltage	Direct on line start	Reduced voltage start 85% of line voltage	Direct on line start
Light/ medium duty	Agitators for liquids, belt conveyors, baking machinery, blowers and exhausters, centrifugal and rotary compressors, dryers, fans, generators, line shafts, machine tools, printing machinery	1.0	1.2	1.1	1.3	1.1	1.3	1.2	1.5
Heavy duty	Brick and clay machinery, bucket elevators, crushers, compressors, hammer mills, paper mill beaters and machines, pulverizers, saw mill machinery, textile machinery	1.2	1.4	1.3	1.5	1.3	1.5	1.4	1.7

Table 4 Correction Factor (Fc) for 180° Arc of Contact
(*Clauses* E-1.1 *and* E-1.1.1)

Arc of Contact	**Factor**	**Arc of Contact**	**Factor**
Degrees		Degrees	
90	0.58	180	1.00
100	0.64	190	1.03
110	0.69	200	1.07
120	0.74	210	1.11
130	0.79	220	1.14
140	0.83	230	1.17
150	0.88	240	1.20
160	0.92	250	1.23
170	0.96	260	1.26
180	1.00	270	1.29

Table 5 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		80	100	125	160	200	250	315
3 x 28 and 3 x 31	720	0.38	0.53	0.74	1.05	1.40	1.82	2.27
	960	0.49	0.68	0.94	1.35	1.79	2.29	2.83
	1 440	0.69	0.95	1.32	1.87	2.47	3.10	3.68
	2 880	0.07	1.63	2.19	2.94			
	100	0.12	0.09	0.13	0.19	0.25	0.33	0.42
	200	0.17	0.17	0.24	0.35	0.46	0.60	0.75
	300	0.22	0.24	0.34	0.50	0.66	0.86	1.08
	400	0.27	0.31	0.44	0.64	0.85	1.10	1.38
	500	0.32	0.38	0.54	0.77	1.03	1.33	1.68
	600	0.37	0.45	0.63	0.90	1.20	1.55	1.95
	700	0.42	0.52	0.72	1.03	1.37	1.77	2.21
	800	0.46	0.58	0.81	1.16	1.54	1.98	2.46
	900	0.50	0.64	0.89	1.28	1.70	2.18	2.70
	1 000	0.59	0.70	0.97	1.39	1.85	2.37	2.92
	1 200	0.68	0.82	1.13	1.61	2.14	2.73	3.31
	1 400	0.75	0.94	1.29	1.83	2.14	3.04	3.63
	1 600		1.04	1.44	2.03	2.67	3.31	3.86
	1 800		1.14	1.58	2.22	2.88	3.53	
	2 000		1.24	1.71	2.40	3.07	3.72	
	2 200		1.34	1.83	2.54	3.24	3.84	
	2 400		1.43	1.95	2.68	3.38		
	2 600		1.52	2.06	2.80	3.47		
	2 800		1.61	2.15	2.91	3.51		
	3 000			2.24	2.99			
	3 200			2.32	3.05			

Table 6 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		80	100	125	160	200	250	315
3 x 32 and 3 x 34	720	0.44	0.61	0.85	1.21	1.62	2.09	2.61
	960	0.56	0.78	1.08	1.55	2.06	2.64	3.26
	1 440	0.80	1.10	1.52	2.16	2.84	3.57	4.24
	2 880		1.88	2.52	3.39			
	100	0.08	0.11	0.15	0.22	0.29	0.38	0.48
	200	0.14	0.20	0.28	0.40	0.53	0.69	0.87
	300	0.20	0.28	0.39	0.57	0.76	0.99	1.24
	400	0.26	0.36	0.51	0.73	0.98	1.27	1.59
	500	0.32	0.44	0.62	0.89	1.19	1.53	1.93
	600	0.37	0.52	0.72	1.04	1.39	1.79	2.25
	700	0.43	0.59	0.83	1.18	1.58	2.04	2.55
	800	0.48	0.67	0.93	1.33	1.77	2.28	2.83
	900	0.53	0.74	1.03	1.47	1.96	2.51	3.11
	1 000	0.58	0.81	1.12	1.60	2.13	2.73	3.36
	1 200	0.68	0.94	1.31	1.87	2.47	3.14	3.81
	1 400	0.78	1.08	1.49	2.11	2.78	3.50	4.18
	1 600	0.87	1.20	1.66	2.34	3.07	3.81	4.45
	1 800		1.32	1.82	2.56	3.32	4.07	
	2 000		1.44	1.97	2.76	3.54	4.28	
	2 200		1.55	2.11	2.93	3.73	4.42	
	2 400		1.65	2.25	3.09	3.89		
	2 600		1.75	2.37	3.23	4.00		
	2 800		1.85	2.48	3.35	4.07		
	3 000			2.58	3.44			
	3 200			2.67	3.51			

Table 7 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		100	125	160	200	250	315	400
4×28 and 4×31	720	0.48	0.73	1.15	1.61	2.19	2.85	3.63
	960	0.62	1.00	1.45	2.05	2.77	3.55	4.38
	1 440	0.87	1.39	2.01	2.80	3.70	4.59	
	100	0.09	0.14	0.20	0.29	0.39	0.53	0.67
	200	0.16	0.25	0.37	0.53	0.73	0.95	1.24
	300	0.23	0.37	0.53	0.75	1.03	1.37	1.77
	400	0.29	0.47	0.69	0.97	1.33	1.74	2.26
	500	0.35	0.57	0.84	1.18	1.61	2.11	2.72
	600	0.41	0.67	0.98	1.38	1.88	2.46	3.15
	700	0.47	0.77	1.12	1.58	2.14	2.78	3.55
	800	0.53	0.86	1.25	1.76	2.39	3.10	3.92
	900	0.59	0.95	1.38	1.94	2.62	3.40	4.26
	1 000	0.65	1.04	1.51	2.12	2.85	3.67	4.56
	1 200	0.75	1.20	1.75	2.44	3.26	4.15	5.03
	1 400	0.85	1.36	1.98	2.74	3.63	4.53	5.32
	1 600	0.95	1.51	2.18	3.01	3.95	4.81	
	1 800	1.04	1.66	2.37	3.25	4.19		
	2 000				3.45	4.38		
	2 200				3.61	4.49		
	2 400				3.73			

Table 8 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		100	125	160	200	250	315	400
4×32 and 4×34	720	0.55	0.89	1.31	1.84	2.50	3.26	4.15
	960	0.71	1.14	1.66	2.34	3.16	4.06	5.00
	1 440	0.99	1.59	2.30	3.20	4.23	5.25	
	100	0.10	0.16	0.23	0.33	0.45	0.60	0.77
	200	0.18	0.29	0.43	0.61	0.83	1.09	1.42
	300	0.26	0.42	0.61	0.86	1.18	1.56	2.02
	400	0.33	0.54	0.79	1.11	1.52	1.99	2.58
	500	0.40	0.65	0.95	1.35	1.84	2.41	3.11
	600	0.47	0.76	1.12	1.58	2.15	2.81	3.60
	700	0.54	0.87	1.27	1.80	2.44	3.18	4.06
	800	0.61	0.98	1.43	2.01	2.73	3.54	4.48
	900	0.67	1.08	1.58	2.22	3.00	3.88	4.87
	1 000	0.73	1.18	1.72	2.42	3.26	4.19	5.21
	1 200	0.85	1.37	2.00	2.79	3.73	4.74	5.75
	1 400	0.97	1.56	2.26	3.13	4.15	5.18	6.08
	1 600	1.08	1.73	2.49	3.44	4.51	5.50	
	1 800	1.19	1.90	2.71	3.71	4.79		
	2 000			2.91	3.94	5.00		
	2 200				4.12	5.13		
	2 400				4.26			

Table 9 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		180	200	250	315	400	500	630
	720	1.19	1.73	2.37	3.28	4.31	5.31	6.22
	960		2.20	2.99	4.08	5.26	6.28	
	1 440			3.97	5.22			
5 x 28 and 5 x 31	100	0.21	0.31	0.43	0.60	0.81	1.03	1.28
	200	0.40	0.57	0.79	1.11	1.48	1.88	2.34
	300	0.56	0.82	1.13	1.57	2.10	2.66	3.29
	400	0.72	1.05	1.44	2.01	2.68	3.39	4.15
	500	0.87	1.28	1.75	2.44	3.23	4.06	4.92
	600	1.02	1.49	2.04	2.83	3.75	4.67	5.58
	700		1.70	2.32	3.21	4.22	5.21	6.12
	800		1.89	2.59	3.56	4.65	5.69	6.52
	900		2.08	2.84	3.90	5.05	6.08	
	1 000		2.27	3.09	4.20	5.39	6.38	
	1 200			3.52	4.74	5.93		
	1 400			3.90	5.15	6.23		
	1 600				5.44			

Table 10 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		180	200	215	315	400	500	630
	720	1.35	1.97	2.70	3.73	4.90	6.04	7.07
	960		2.50	3.40	4.64	5.98	7.14	
	1 440			4.51	5.94			
5 x 32 and 5 x 34	100	0.24	0.35	0.49	0.68	0.92	1.17	1.45
	200	0.45	0.65	0.90	1.26	1.68	2.14	2.66
	300	0.64	0.93	1.28	1.79	2.39	3.03	3.74
	400	0.82	1.19	1.64	2.29	3.05	3.86	4.72
	500	0.99	1.45	1.99	2.77	3.68	4.62	5.60
	600	1.16	1.69	2.32	3.22	4.26	5.31	6.35
	700		1.93	2.64	3.65	4.80	5.93	6.96
	800		2.15	2.95	4.05	5.29	6.47	7.42
	900		2.37	3.23	4.43	5.74	6.91	
	1 000		2.58	3.51	4.78	6.13	7.26	
	1 200			4.01	5.39	6.74		
	1 400			4.43	5.86	7.09		
	1 600				6.19			

Table 11 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		200	250	315	400	500	630	800
	720		2.50	3.53	4.84	6.01	7.20	
	960			4.38	5.89	7.07		
6 x 28 and 6 x 31	100	0.27	0.45	0.65	0.91	1.17	1.48	1.87
	200	0.49	0.83	1.19	1.67	2.14	2.72	3.39
	300		1.19	1.70	2.37	3.03	3.83	4.73
	400		1.53	2.17	3.02	3.85	4.82	5.89
	500		1.85	2.62	3.64	4.61	5.72	6.85
	600		2.15	3.05	4.21	5.29	6.47	7.57
	700		2.45	3.45	4.74	5.91	7.10	8.01
	800		2.72	3.83	5.22	6.43	7.56	
	900			4.18	5.66	6.86		
	1 000			4.50	6.03	7.19		
	1 100			4.80	6.35	7.42		
	1 200				6.61			

Table 12 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		200	250	315	400	500	630	800
	720		2.88	4.07	5.58	6.93	8.30	
	960			5.05	6.79	8.15		
6×32 and 6×34	100	0.31	0.52	0.75	1.05	1.35	1.71	2.15
	200	0.57	0.96	1.37	1.92	2.47	3.13	3.91
	300		1.37	1.96	2.73	3.49	4.41	5.45
	400		1.76	2.50	3.48	4.44	5.56	6.79
	500		2.13	3.02	4.19	5.31	6.59	7.89
	600		2.48	3.52	4.85	6.10	7.46	8.72
	700		2.82	3.98	5.46	6.81	8.18	9.23
	800		3.14	4.41	6.02	7.41	8.71	
	900			4.82	6.52	7.91		
	1 000			5.19	6.95	8.29		
	1 100			5.53	7.32	8.55		
	1 200				7.62			

Table 13 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm					
		250	315	400	500	630	800
	720	2.16	3.55	5.05	6.61	8.15	
	960		4.38	6.10	7.73		
7×28 and 7×31	100	0.40	0.66	0.96	1.30	1.69	2.11
	200	0.73	1.21	1.75	2.37	3.09	3.85
	300	1.04	1.71	2.49	3.35	4.35	5.36
	400	1.32	2.19	3.17	4.25	5.49	6.67
	500	1.60	2.65	3.81	5.09	6.48	7.74
	600	1.86	3.07	4.40	5.34	7.34	8.54
	700	2.11	3.47	4.95	6.49	8.03	9.01
	800	2.34	3.85	5.44	7.06	8.54	
	900		4.19	5.87	7.51		
	1 000		4.49	6.24	7.85		
	1 100		4.77	6.54	8.06		
	1 200			6.77			

Table 14 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm					
		250	315	400	500	630	800
	720	2.48	4.08	5.80	7.60	9.37	
	960		5.03	7.01	8.88		
7×32 and 7×34	100	0.46	0.76	1.10	1.49	1.94	2.43
	200	0.84	1.39	2.01	2.72	3.55	4.42
	300	1.19	1.97	2.86	3.85	5.00	6.16
	400	1.52	2.52	3.64	4.89	6.30	7.67
	500	1.84	3.04	4.38	5.85	7.45	8.90
	600	2.14	3.53	5.06	6.71	8.44	9.81
	700	2.42	3.99	5.69	7.46	9.23	10.35
	800	2.69	4.42	6.25	8.11	9.82	
	900		4.81	6.75	8.63		
	1 000		5.16	7.17	9.02		
	1 100		5.48	7.52	9.26		
	1 200			7.78			

Table 15 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm					
		315	400	500	630	800	1 000
8 × 28 and 8 × 31	720			6.94	8.92		
	960			8.03			
	100		0.96	1.38	1.87	2.45	3.07
	200		1.76	2.51	3.41	4.46	5.53
	300		2.50	3.55	4.79	6.21	7.62
	400		3.18	4.50	6.04	7.73	9.29
	500		3.81	5.37	7.13	8.97	10.45
	600		4.39	6.15	8.06	9.89	
	700		4.92	6.82	8.80	10.44	
	800		5.39	7.39	9.32		
	900			7.83			
	1 000			8.14			

Table 16 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm					
		315	400	500	630	800	1 000
8 × 32 and 8 × 34	720			7.87	10.11		
	960			9.10			
	100		1.09	1.56	2.12	2.78	3.48
	200		2.00	2.84	3.86	5.05	6.27
	300		2.83	4.02	5.43	7.04	8.64
	400		3.60	5.10	6.84	8.76	10.53
	500		4.32	6.09	8.08	10.17	11.84
	600		4.98	6.97	9.13	11.21	
	700		5.58	7.73	9.97	11.83	
	800		6.11	8.37	10.56		
	900			8.87			
	1 000			9.22			

Table 17 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		500	560	630	710	800	900	1 000
9 × 28 and 9 × 31	720		7.98	9.23	10.35			
	100	1.33	1.64	1.96	2.30	2.67	3.05	3.46
	150	1.90	2.34	2.79	3.27	3.79	4.34	4.89
	200	2.43	3.00	3.57	4.18	4.85	5.53	6.22
	250	2.94	3.62	4.31	5.04	5.84	6.64	7.45
	300	3.43	4.22	5.02	5.85	6.76	7.66	8.57
	350	3.90	4.79	5.69	6.62	7.62	8.60	9.57
	400	4.35	5.33	6.31	7.33	8.40	9.43	10.44
	450	4.77	5.84	6.90	7.98	9.11	10.16	11.17
	500	5.17	6.31	7.44	8.57	9.73	10.77	11.74
	550	5.55	6.76	7.94	9.10	10.26	11.27	12.15
	600	5.89	7.17	8.39	9.56	10.70	11.62	
	650		7.54	8.77	9.95	11.03		
	700		7.86	9.11	10.25	11.25		
	750		8.15	9.39	10.47			
	800			9.60				
	850			9.75				

Table 18 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		500	560	630	710	800	900	1 000
	720		9.05	10.47	11.74			
9 × 32 and 9 × 34	100	1.51	1.86	2.22	2.61	3.03	3.46	3.92
	150	2.15	2.65	3.16	3.71	4.30	4.92	5.55
	200	2.76	3.40	4.05	4.74	5.50	6.27	7.06
	250	3.34	4.11	4.89	5.72	6.62	7.53	8.45
	300	3.89	4.79	5.69	6.64	7.67	8.69	9.72
	350	4.42	5.43	6.45	7.51	8.64	9.75	10.85
	400	4.93	6.04	7.16	8.31	9.53	10.70	11.84
	450	5.41	6.62	7.82	9.05	10.33	11.52	12.67
	500	5.86	7.16	8.44	9.72	11.03	12.22	13.32
	550	6.29	7.67	9.00	10.32	11.64	12.78	13.78
	600	6.68	8.13	9.51	10.84	12.13	13.18	
	650		8.55	9.95	11.28	12.51		
	700		8.92	10.33	11.62	12.76		
	750		9.24	10.65	11.88			
	800			10.89				
	850			11.06				

Table 19 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm						
		630	710	800	900	1 000	1 120	1 250
	720	8.30	10.21					
10 × 28 and 10 × 31	100	1.83	2.32	2.79	3.28	3.67	4.17	4.64
	150	2.60	3.30	3.96	4.66	5.19	5.90	6.54
	200	3.33	4.22	5.06	5.93	6.60	7.47	8.26
	250	4.02	5.10	6.00	7.12	7.89	8.91	9.79
	300	4.66	5.90	7.04	8.22	9.07	10.18	11.11
	350	5.28	6.66	7.93	9.21	10.12	11.28	12.20
	400	5.84	7.37	8.73	10.10	11.03	12.18	13.02
	450	6.37	8.01	9.45	10.87	11.77	12.87	13.55
	500	6.85	8.58	10.08	11.51	12.36	13.33	
	550	7.27	9.09	10.60	12.01	12.74		
	600	7.64	9.51	11.03	12.37			
	650	7.96	9.86	11.33				
	700	8.21	10.12	11.53				
	750	8.40	10.30					
	800	8.52						

Table 20 Power Ratings (kW/25 mm) for Belt Type Shown with 180° Arc of Contact on Smaller Pulley

(*Clauses* E-1.1 *and* E-1.1.1)

Belt Type	Rev/min of Faster Shaft	Smaller Pulley Diameter in mm 630	710	800	900	1 000	1 120	1 250
	720	9.43	11.60					
10 × 32 and 10 × 34	100	2.08	2.64	3.17	3.73	4.17	4.74	5.27
	150	2.96	3.75	4.50	5.29	5.90	6.70	7.43
	200	3.78	4.80	5.75	6.74	7.50	8.49	9.39
	250	4.57	5.79	6.92	8.09	8.97	10.12	11.13
	300	5.30	6.71	8.00	9.34	10.31	11.57	12.63
	350	6.00	7.57	9.01	10.47	11.50	12.82	13.86
	400	6.64	8.37	9.92	11.48	12.53	13.94	14.80
	450	7.24	9.10	10.74	12.35	13.38	14.63	15.40
	500	7.78	9.75	11.45	13.08	14.04	15.15	
	550	8.26	10.33	12.05	13.65	14.48		
	600	8.68	10.81	12.53	14.06			
	650	9.04	11.21	12.88				
	700	9.33	11.51	13.10				
	750	9.55	11.70					
	800	9.68						

Table 21 Minimum Pulley Diameters for Given Belt Speeds and Belt Plies in mm

(*Foreword*, and E-1.1.1)

No. of Plies	Maximum Belt Speed, m/s 10	15	20	25	30
3	90	100	112	140	180
4	140	160	180	200	250
5	200	224	250	315	355
6	250	315	355	400	450
7	355	400	450	500	560
8	450	500	560	630	710
9	560	630	710	800	900
10	630	710	800	900	1 000

ANNEX F

(*Clause* 13.1)

INFORMATION TO BE GIVEN WITH THE ENQUIRY OR WHEN PLACING THE ORDER

The following particulars should be supplied when placing an enquiry or order for a belt:

a) Maximum power to be transmitted.

b) Motor power [if different from (a)], and starting method, e.g. direct-on-line.

c) Diameters of pulleys.

d) Widths of pulleys.

e) Centre distance between pulleys.

f) Positions and diameters of any jockey pulleys.

g) Type of drive, i.e. open or crossed, horizontal or inclined, particulars of machinery, tight side upper or lower, type of fork used, if any.

h) Conditions under which belt is to be used, particularly whether corrosive liquids or vapours are present.

j) Other relevant details of operating conditions.

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